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EVALUATION OF MOUNTAIN PINE BEETLE INFESTATIONS WOLF MOUNTAINS, CROW INDIAN RESERVATION, MONTANA 1973

by

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ABSTRACT

Mountain pine beetle reached epidemic levels in second-growth ponderosa pine stands on Bureau of Indian Affairs and private lands on the Crow Indian Reservation. Approximately 9,106 trees containing 420,266 merchantable board feet were killed from 1971 to 1973. This is about 24 percent of the merchantable ponderosa pine in stands surveyed. Stands are stagnated, and trees appear stressed which is probably predisposing them to beetle attack.

An increase in size of area infested and number of trees killed is expected in 1974. Commercial thinning to remove infested trees and reduce basal area is recommended to alleviate the problem. Slash disposal is highly recommended during logging to prevent buildup of pine engraver beetle populations.

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INTRODUCTION

An outbreak of mountain pine beetle, *Dendroctonus ponderosae* Hopk., reached epidemic status in second-growth ponderosa pine stands on Bureau of Indian Affairs and private lands in Thompson Creek drainage, with minor infestations in Corral, Little Corral, and Cache Creek drainages in the Wolf Mountains, Crow Indian Reservation, in southeastern Montana (Figs. 1 and 2).

The majority of infested trees occur on Bureau of Indian Affairs lands (85 acres) with about 77 infested acres on private ownership. Infested stands are heavily stocked which may be putting stress on trees for moisture, and this, coupled with the large amount of windthrow and top-broken trees caused by heavy snow in 1971, was probably a major factor responsible for the outbreak (McGregor and Kohler, 1973).

A preliminary evaluation was conducted in November 1973 (McGregor and Kohler, 1973). Because the outbreak became quite extensive in a short period of time with large numbers of newly attacked trees, BIA and State personnel requested that an operational survey be conducted to determine the current status of the infestation.

METHODS

To determine number of trees infested, volume loss, and green stand data, a variable plot cruise was conducted in the Thompson Creek drainage during November 1973. Plots were located at 5-chain intervals on lines 5 chains apart. Prisms (20-factor) were used to determine trees to be tallied in each plot. Each tree 5 inches d.b.h. and larger occurring in each variable plot was recorded by species, measured for diameter at breast height, and total height was determined with a clinometer for volume estimates. Then trees were classified into one of the following six classes:

1 - Green uninfested; trees to be left as stock trees.

2 - Attacked in 1973; green or fading foliage, brood in cambium.

3 - Attacked in 1972; some foliage, brood emerged.

4 - Pitchout; green foliage, pitchtubes, no brood.

5 - Green trees, uninfested, but to be logged.

Data were analyzed using a modified Region 1 ADP timber sale cruise program which provided summaries of the number of infested trees and volume loss by year and residual green stand for the area surveyed. A total of 162 acres were surveyed.

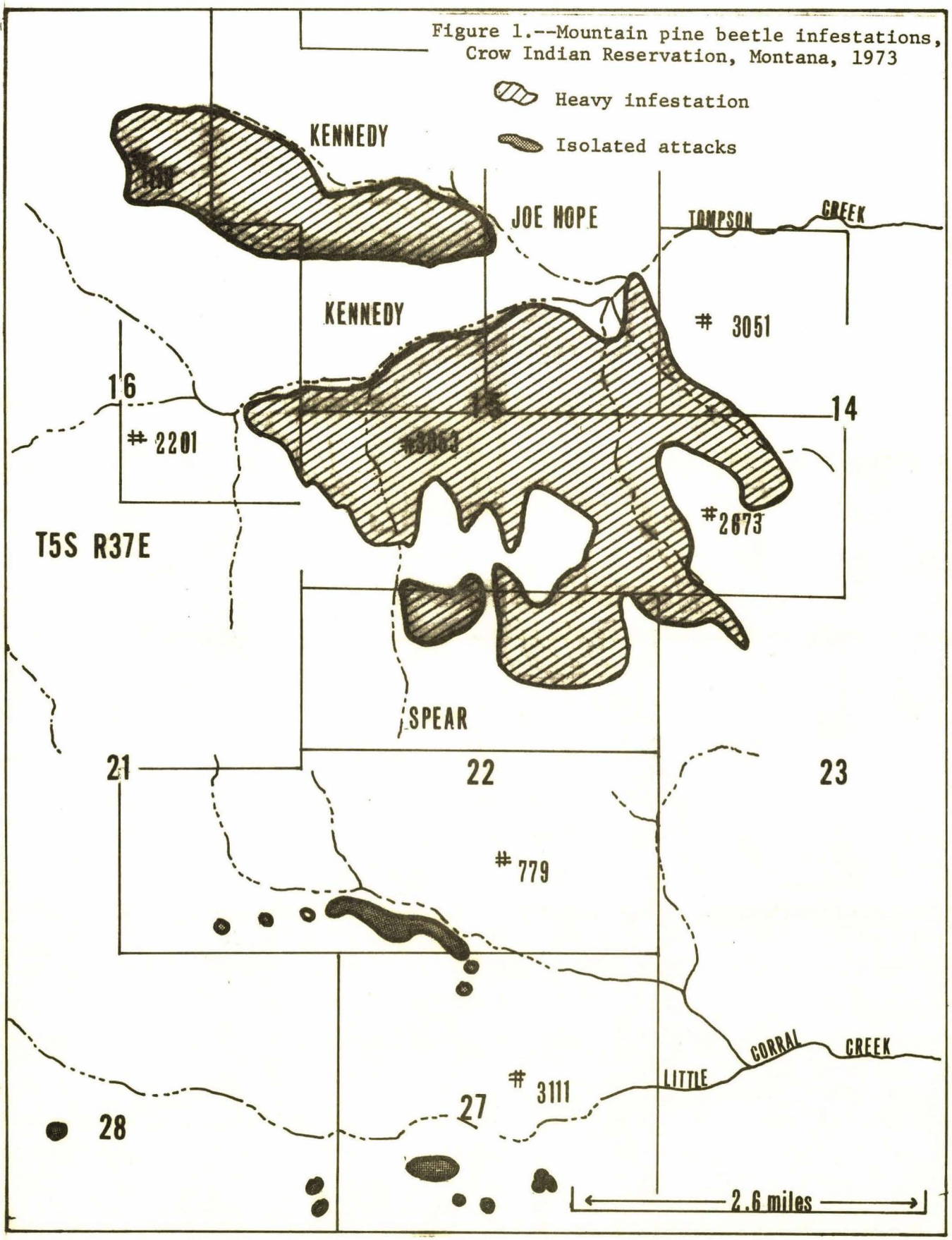

Figure 1.--Mountain pine beetle infestations, Crow Indian Reservation, Montana, 1973

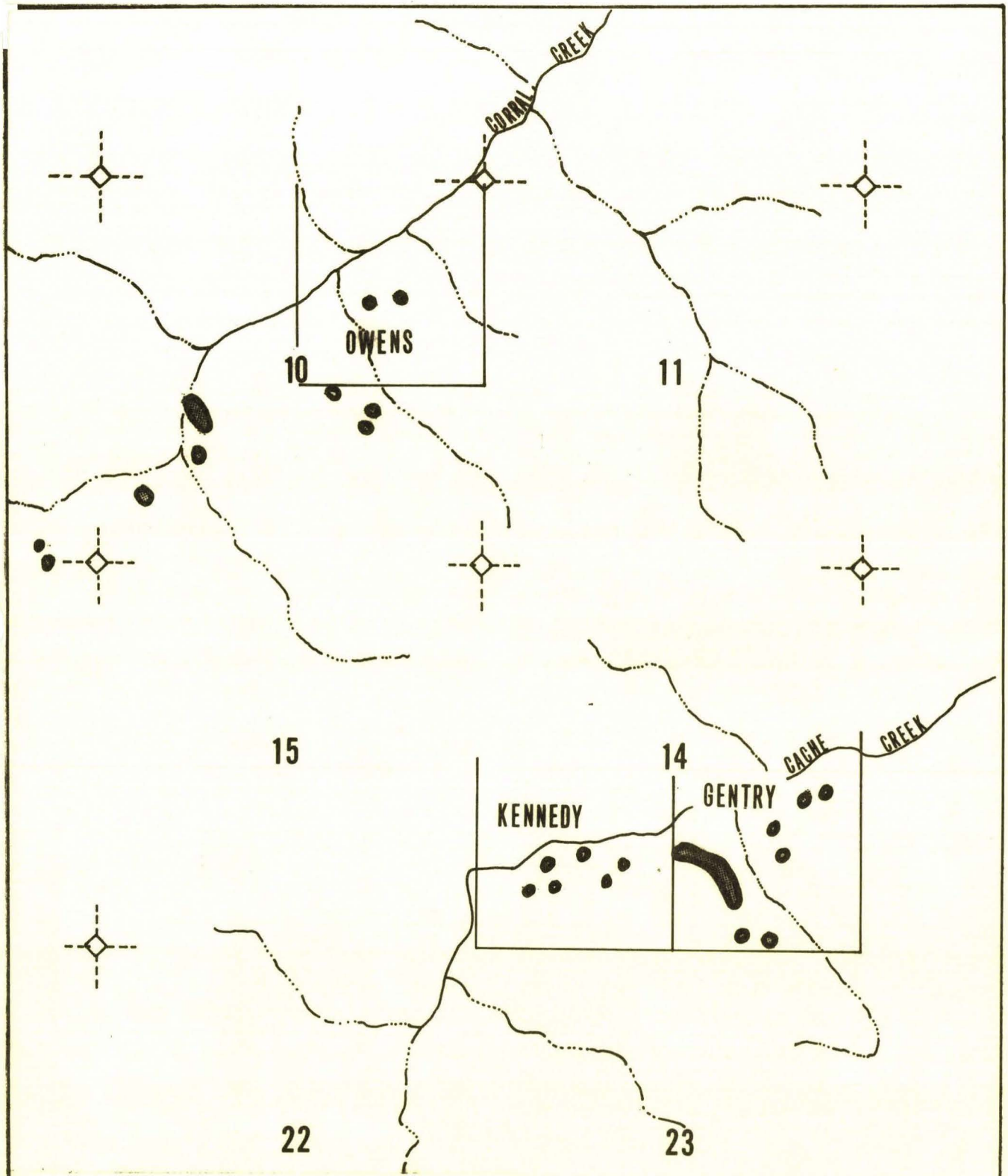

Figure 2.--Isolated mountain pine beetle attacks, Crow Indian Reservation, 1973

RESULTS

The coniferous stand surveyed was nearly pure ponderosa pine with scattered Douglas-fir and cottonwood. Most of the stand is an even aged 60- to 80-year-old age class with some overstory where the trees are 180+ years old. Elevation within the infested area ranges from 4,200 to 4,820 feet. Habitat types have not been described for these areas.

Summaries of tree mortality and volume loss data are provided in Tables 1 and 2. From 1971 to 1973, the estimated number of trees killed was 9,106 containing a volume of 420,266 board feet of merchantable timber. Losses amounted to 16,226 board feet in 1971; 124,004 in 1972; and 280,036 in 1973. Approximately 23.8 percent of the ponderosa pine 5 inches d.b.h. and larger was killed during this 3-year period. In 1971, 1.3 percent of the ponderosa pine was killed, 6 percent in 1972, and 16.5 in 1973. Average d.b.h. of infested trees was 14.5 in 1971, 13.3 in 1972, and 13.5 in 1973. Residual green stand averages 11.7 inches d.b.h. Survey data shows that the number of infested trees more than doubled during the past 3 years. Buildup ratios were 1:4.4 from 1971 to 1972, and 1:2.5 from 1972 to 1973.

The average d.b.h. of crop trees was reduced from 12.6 inches d.b.h. prior to beetle attack to 11.8 inches d.b.h. after beetle attack. The number of crop trees dropped from an average of 125.4 per acre to 96.5 trees per acre for the same period of time.

DISCUSSION

Mountain pine beetle populations increased rapidly in second-growth ponderosa pine stands in the Wolf Mountains. Stands surveyed appear overstocked, decadent, and in a stressed condition very similar to ponderosa pine stands currently infested with mountain pine beetle in Ninemile and areas along the Clark Fork River near Missoula, Montana (Bousfield, et al., 1973; McGregor and Lood, 1973). This undoubtedly contributed to stand stagnation and promoted beetle activity. Ponderosa pine in the 60- to 80-year-old age class in overstocked stands is usually more susceptible to mountain pine beetle infestation (Sartwell, 1971).

Although mountain pine beetle can produce beneficial effects, particularly in overstocked stands, this type of mortality should not be considered beneficial as the beetle kills indiscriminately under epidemic conditions. Many trees killed during this outbreak would normally be left as crop trees during a commercial thinning program. Wortendyke (1968) indicated that there is evidence a relationship exists between degree of overstocking and magnitude of beetle-caused losses within infested ponderosa pine stands in the Wallowa-Whitman National Forest in Oregon. However, the available data was insufficient to statistically show significance in a linear relationship.

Table 1.--Estimated tree mortality, mountain pine beetle infestation, Wolf Mountains, Crow Indian Reservation, 1971-73

Unit surveyed	Acres surveyed	Infested trees/acre						Number ponderosa pine killed			
		1971	Mean d.b.h.	1972	Mean d.b.h.	1973	Mean d.b.h.	1971	1972	1973	Total
Kennedy	52	4.6	11.0	8.7	14.0	17.3	13.0	240	452	899	1,591
Hope	25	--	--	8.9	13.0	28.2	13.0	--	223	705	928
2201	3	--	--	--	--	18.3	15.0	--	--	55	55
3053	82	.5	18.0	6.8	13.0	18.5	13.0	40	562	1,517	2,079
Total or average	162	5.1	14.5	6.2	13.3	20.5	13.5	280	1,237	3,176	4,653

Table 2.--Estimated ponderosa pine volume loss due to mountain pine beetle, Crow Indian Reservation, 1971-73

Unit surveyed	Acres surveyed	Volume loss/acre (board feet)			Total volume loss (board feet)		
		1971	1972	1973	1971	1972	1973
Kennedy	52	170	943	1,489	8,821	49,054	77,435
Hope	25	0	821	705	0	20,523	52,591
2201	3	0	0	3,539	0	0	10,617
3053	82	90	676	1,700	7,405	54,427	139,393
Total	162	260	2,440	7,433	16,226	124,004	280,036

The mountain pine beetle is reducing the value of the stand and additional mortality can be expected if the stand's stagnated condition is permitted to continue. Buildup ratios the past 3 years indicate the potential for continued mortality. However, amount of buildup and tree mortality that might occur from 1973 to 1974 cannot be predicted.

Commercial thinning and salvage logging is highly recommended to reduce the potential for additional losses in 1974. During logging or commercial thinning, disposal of slash is highly recommended to prevent a buildup of pine engraver beetle, *Ips pini* Say, populations. Recommendations for preventing an *Ips* buildup were given by McGregor and Kohler (1973).

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